

Zortman & Landusky Mines



HJR 43 Water Quality Impacts

A staff paper presented to the Environmental Quality Council
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Cover Photos

Reclamation at Zortman Mine, 2004
EQC Staff Photo

Reclamation at Landusky Mine, 2004
EQC Staff Photo

T able of Contents

Introduction	1
House Joint Resolution 43	1
Response	1
Location	2
Background	3
Impacts on Surface Water and Ground Water	7
Swift Gulch	10
Impacts to the Milk and Missouri River Drainages	12
Current Reclamation Efforts and Water Quality Status	17
Future Needs - Reclamation and Water Quality	22
Reclamation	22
Water Treatment	24
Summary	26
Endnotes	28
Appendix 1	31

Figures and Tables

Figure 1	Map of Zortman-Landusky Area	4
Figure 2	Landusky Mine. Facilities and Land Status Map	13
Figure 3	Zortman Mine. Facilities and Land Status Map	15
Table 1	Exceedences of Consent Decree Standards - May 2003 to May 2004	16
Table 2	Zortman Water Treatment Plant - Typical Chemistry	18
Table 3	Landusky Water Treatment Plant - Typical Chemistry	19
Table 4	Bioreactor Chemistry for Leach Pad Process Water	21

I ntroduction

House Joint Resolution 43

The preamble of HJR 43, enacted by the 2003 Montana Legislature, describes in general terms the status of the reclamation efforts that have been conducted at the Zortman and Landusky mines by the Montana Department of Environmental Quality (DEQ) and the federal Bureau of Land Management (BLM) following the bankruptcy of Pegasus Gold Corporation (Pegasus) and the abandonment of the mines by its operator, Zortman Mining Incorporated (ZMI). HJR 43 asks an appropriate interim committee to review how those efforts are addressing water quality issues at the mines and whether additional reclamation efforts are necessary. The mines are being reclaimed by the DEQ and its contractors with mine bond proceeds made available following a settlement agreement with the sureties, with supplemental funds from the bankruptcy settlement, and with state and federal funds.

Specifically, HJR 43 asks the interim committee to:

- (1) identify the impacts on surface water and ground water, including the recent degradation of Swift Gulch, attributable to past or present activities at the mine sites;
- (2) determine if there are identifiable downstream impacts on the Milk and Missouri River drainages attributable to past or present activities at the mine sites;
- (3) determine whether the surface water and ground water resources in the watersheds affected by the mine operations are being protected by the current or proposed state reclamation; and
- (4) determine the potential impacts to surface water and ground water resources if additional funding for water treatment and reclamation does not become available.

Response

The Legislative Council assigned HJR 43 to the Environmental Quality Council (EQC), and the EQC decided to combine a review of the issues in HJR 43 with a review of the current status of metal mine bonding in Montana (see *Metal Mine Bonding in Montana - Status and Policy Considerations*, Montana EQC staff report, Larry D. Mitchell, October 2004). The EQC decided that both topics would be reported in separate staff

papers using currently available information from several sources. Additionally, the EOC heard presentations on the issues of metal mine bonding and the status of reclamation at the Zortman and Landusky mines at its regularly scheduled meetings during the interim.

Staff reviewed several of the many research reports and studies that have been prepared, especially since the early 1990s, on the operation and reclamation of the Zortman and Landusky mines and their impact on water quality. However, a thorough review and understanding of these

Staff relied on key reports, court documents, and interviews with people who have a professional involvement with the mines and their reclamation.

complex and sometimes contradictory technical reports is beyond the scope of this paper. Staff relied on key reports, court documents, and interviews with people who have a professional involvement with the mines and their reclamation. For a partial list of reports and documents that have been produced on the Zortman and Landusky mines, see R1-R8, References, listed in the Final Supplemental Environmental Impact Statement for Reclamation of the Zortman and Landusky Mines, Phillips County, prepared by the DEQ and the BLM, December 2001.

L ocation

From 1979 until it filed for bankruptcy in early 1998, Pegasus Gold Corporation, through its subsidiary ZMI, operated two open-pit cyanide heap leach gold mines in the Little Rocky Mountains immediately south of the Fort Belknap Reservation in north-central Montana (**Figure 1**). The Zortman mine permit includes approximately 406 acres (122 acres BLM; 284 acres private mining claims) and the Landusky mine permit includes approximately 783 acres (472 acres BLM; 311 acres private mining claims).

The Zortman mine is located about 1 1/2 miles east of the much larger Landusky mine. Both mines are located on a mountain divide that separates the Missouri River drainage to the south from the Milk River drainage to the north. The Fort Belknap Reservation boundary is approximately 3 miles north of the Zortman mine and is approximately 1/4 mile to the nearest disturbance at the Landusky mine.¹

B ackground

The mines were granted a series of permit amendments that expanded the size of the operations until Pegasus applied for a major permit expansion in 1992, which was eventually not implemented. Discovery of significant acid rock drainage problems at both mines resulted in a need for a major revision of the existing mine reclamation plans and a review of existing bond amounts. It was determined that the proposed 1992 mine expansion would require a detailed analysis through the preparation of an environmental impact statement (EIS).

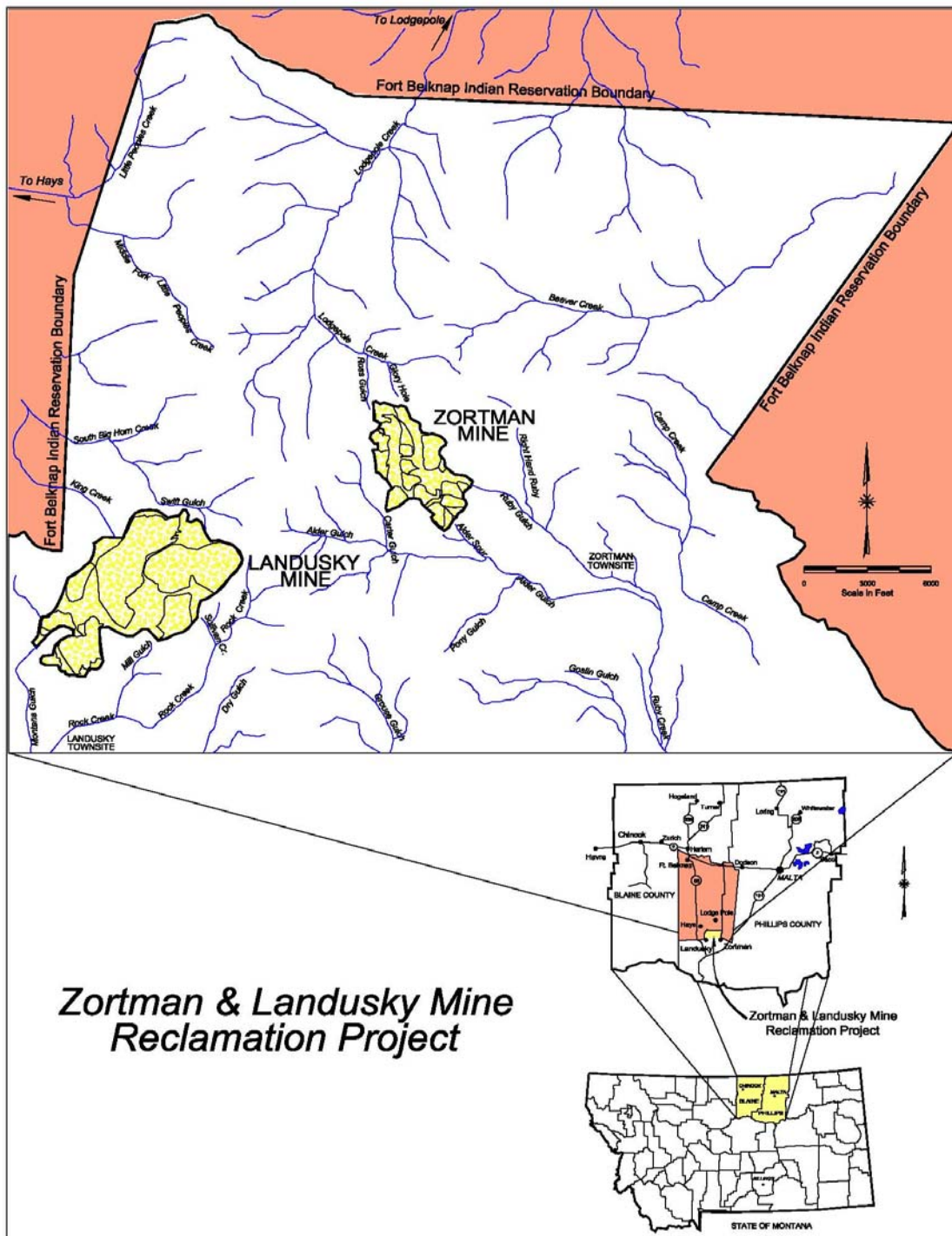
Between 1993 and 1995, litigation under the Water Quality Act was initiated in state and federal courts alleging unpermitted mine discharges to state waters. Settlement discussions resulted in the signing of a Consent Decree between Pegasus, the DEQ, the Environmental Protection Agency (EPA), a citizen's group, and the Fort Belknap Tribes effective in September 1996.² The Consent



Landusky Mine, 1993. BLM Photo.

Decree obligated Pegasus to construct water collection systems and water treatment plants, bond for the immediate operation of the water treatment plants, and establish a trust reserve for their long-term operation and maintenance. It also provided for a penalty and required the company to perform ground water, aquatic, and health studies, implement monitoring programs, and provide improvements to drinking water systems on the reservation. The Consent Decree established temporary water quality standards and obligated the company to obtain Montana Pollution Discharge Elimination System (MPDES) permits for each discharge to state waters based on more stringent water quality standards once the water treatment plants and water discharge capture systems were in place and operational. The Consent Decree did not address surface reclamation of the mines because the decree was a settlement of alleged violations of the Water Quality Act, which did not include jurisdiction over surface reclamation requirements.

Figure 1: Map of the Zortman-Landusky Area



The BLM and the DEQ completed an EIS for the proposed mine expansion, which included a revised land reclamation plan, and the agencies issued a Record of Decision approving the expansion in October 1996. The BLM's decision to expand the mine was appealed to the federal Interior Board of Land Appeals (IBLA) by citizen groups and the Fort Belknap Tribes in late 1996. The state's decision to approve the mine expansion was challenged in state court by citizens' groups and the Fort Belknap Tribes in early 1997. The IBLA issued an order in June 1997 to stay the mine expansion approval pending further administrative review of the BLM decision. In January 1998, Pegasus and ZMI filed for bankruptcy protection before the IBLA issued a ruling, and in March 1998, the companies announced their decision to not proceed with the mine expansion but to close and reclaim the mines instead.

The agencies voided the now-moot 1996 mine expansion decision in June 1998, issued a new Record of Decision, and attempted to increase the surface reclamation bond based on the revised reclamation plan reviewed in the 1996 EIS, acknowledging at that time that the existing bonds were an estimated \$8.5 million less than what was needed to implement the agencies' preferred reclamation alternative. Pegasus objected to the BLM's June 1998 selection of reclamation alternatives, which would have increased the bond amount and appealed the decision to the IBLA. The additional bonds were not provided as the bankruptcy actions moved forward.

In November 1998, the DEQ signed a settlement agreement with Pegasus' sureties, National Union Fire Insurance Company and the United States Fidelity and Guarantee Company, that made available to the state the balance of the unspent reclamation bonds and water treatment bonds required under the previously approved reclamation plan and the Consent Decree. The bond funds available to the DEQ for the Zortman and Landusky mines are as follows:

\$10,024,000	Zortman reclamation bond
\$19,600,000	Landusky reclamation bond
\$ 2,040,970	Construction assurance - for water capture and treatment plants (bond was \$10,100,000 but Pegasus had built much of the infrastructure)
\$13,895,101	Water treatment bond for 20-year operation and maintenance (bond was \$14,626,422 but Pegasus had paid for 1 of the 20 years prior to settlement)
\$ 389,000	Exploration permit reclamation bond
\$ 295,485	Open-cut mine reclamation bond for an offsite clay pit.

Additionally, the DEQ received \$1,050,000 from the bankruptcy court in partial settlement of state claims filed against the assets based on an identified need for additional reclamation. The court directed that \$450,000 be designated for reclamation at the Zortman site, with the balance to be used for interim site operations and maintenance at both sites until a reclamation contractor could be retained by DEQ.

In November 1998, the IBLA issued a decision on Fort Belknap's 1996 appeal of the BLM mine expansion decision, and it ordered the BLM to work with the Tribes on the selection of a reclamation alternative for the mines that considered potential impacts on tribal water resources. This action essentially vacated the decisions made under the 1996 EIS, which were based on the company's now-abandoned expansion plans. The BLM was also directed to develop additional information about ground water conditions at the mines. Since then, the BLM and the DEQ, in consultation with the Fort Belknap Tribes, the EPA, and others, produced a final Supplemental Environmental Impact Statement (SEIS), which was completed in December 2001. In May 2002, the agencies issued a new joint Record of Decision that selected reclamation alternative Z6 for the Zortman mine and reclamation alternative L4 for the Landusky mine.

However, these alternatives were dependent on the receipt of an additional \$22.5 million in reclamation funds beyond what was available from the mine reclamation bonds. The record of decision also provided that the agencies would reclaim the mines under alternatives Z3 and L3, the "reserved selected alternatives", if the additional funding could not be found. These alternatives were less costly and perceived by some to be less protective than alternatives Z6 and L4. The DEQ and the BLM determined that all four alternatives would reclaim the mines in compliance with state and federal reclamation requirements while protecting human health, the environment, and tribal trust resources. With either choice, the SEIS also determined that the \$14.8 million (the estimated 2017 value) trust fund provided by Pegasus under the Consent Decree for the long-term maintenance and operation of the water treatment facilities at the mines was \$11 million less than what would be needed to run the plants beginning in July 2017 when the short-term water treatment bond was expended.

Following the May 2002 Record of Decision, the DEQ began reclaiming the two mine sites with reclamation bond settlement funds by performing tasks that were common to both the Z3 and Z6 alternatives at the Zortman mine site and common to both the L3 and L4 alternatives at the Landusky mine site. In June 2002, the Fort Belknap

Tribes filed an appeal of the Record of Decision with the IBLA on several grounds, including that failure to reclaim the sites in accordance with at least the selected alternatives, Z6 and L4, would violate the BLM's obligation to protect the Tribes' resources.³ In July 2002, the Fort Belknap Tribes and three citizens' groups also filed suit in state District Court challenging the Record of Decision alleging that failure to implement alternatives Z6 and L4 would violate the Montana Constitution and the state Metal Mine Reclamation Act.⁴ Both actions are currently pending. Through various cost-saving measures and the procurement of additional reclamation funds, the DEQ has been able to implement most of the components of alternatives Z6 and L4.

I mpacts on Surface Water and Ground Water

HJR 43 asks the interim committee to identify the impacts on surface and ground water, including the recent degradation of Swift Gulch, attributable to past or present activities at the mine sites. A review of only a selection of the many documents prepared on this subject cannot help but lead to the conclusion that there have been impacts to both the surface water and ground water at the mine sites from both historic and more recent mining activities. However, the current, future, and long-term extent, severity, and effect of those impacts is more difficult to describe or predict with any certainty. It is clear that in the absence of continued water capture and treatment operations, there will be significant adverse impacts to surface and ground water quality, at least in the vicinity of the mines.

The 1993 and 1995 federal and state water quality complaints that resulted in the Consent Decree also resulted in a \$2 million fine against Pegasus for alleged unlawful discharges to surface and ground waters. A review of agency files between 1977 and 1995 documented acid mine drainage from historic and contemporary mine workings, multiple releases of cyanide to surface and ground water from leaks, spills, overflows, and emergency cyanide solution disposals, and elevated metals in surface and ground water samples in many areas of the Zortman and Landusky mines.⁵ In a recent case in which federal District Court Judge Donald Molloy declined to rule on whether the federal government broke its trust obligations to the Fort Belknap Tribes in its oversight of the mines, pending a decision by the IBLA in the Tribes' June 2002 appeal, Judge Molloy stated, without citing specifics, that "It is undisputed that the Zortman-

Landusky mines have devastated portions of the Little Rockies, and will have effects on the surrounding area, including the Fort Belknap Reservation for generations. That devastation, and the resulting impact on tribal culture cannot be overstated."⁶ The BLM does dispute this statement and claims that, in litigation thus far, the Tribes have not shown any damage to their trust resources from the mines for which the BLM is at fault.⁷ The Tribes dispute the BLM's conclusion.

In January 2004, the Tribes filed a federal Clean Water Act complaint in federal District Court in Missoula against the DEQ, the BLM, and Mr. Luke Ployhar who recently purchased 71 private mining claims totaling 1,080 acres from the Pegasus bankruptcy trustee and who now owns much of the mine property. The complaint alleges that the defendants discharged pollutants in excess of water quality standards and that they failed to obtain or issue state or federal water quality discharge permits as required by law.⁸ The suit and its exhibits cite numerous instances in which watersheds have been contaminated by acid mine drainage and provide selected sampling data that allege violations of certain water quality standards for nitrates, cyanide, selenium, manganese, copper, and iron.

In response to another pending lawsuit, the DEQ admits that acid mine drainage, cyanide, selenium, and nitrates impact surface and ground waters that are hydrologically connected to the mines and that the impacts from acid mine drainage will continue in the long term.⁹ The agency also claims that it is capturing and treating all waters that are hydrologically connected to the mines. However, the Fort Belknap tribal community, through comments and litigation, has repeatedly expressed its concern about the mines' impact on the water quality of the reservation.

Studies of reservation domestic water supplies prepared by the federal Agency for Toxic Substances and Disease Registry (ATSDR) in 1998 concluded that based on a review of available data, there was no apparent public health hazard to the residents of the Fort Belknap Reservation from mine activities.¹⁰ The study found no evidence that people on the reservation were exposed to dangerous levels of contaminants in sediments, surface water, or ground water. Hydrologic studies conducted in 1983 and 1993 found that natural water quality on the reservation away from the mountains was naturally variable and often poor, but none of the studies cited mine activities as contributing to poor quality of the aquifers.¹¹ Further, at the request of the Tribes, the EPA conducted a sampling study of domestic water supplies and streams on the reservation in June 2000 and found no evidence of impacts to water resources from the mines. No cyanide was detected in any of the wells sampled on the reservation. Water quality in the reservation wells closest to the mines showed no exceedences of

drinking water standards.¹² There are a number of public water supplies owned and operated by the Tribe in the Hays and Lodgepole area. Hays is downstream from the Landusky mine, and Lodgepole is downstream from the Zortman mine. The EPA is not aware of any violations of chemical standards in any of these community water supplies based on periodically required reporting requirements.¹³

The DEQ has stated that there have been no exceedences of water quality standards on the Fort Belknap Reservation,¹⁴ but sampling data from DEQ's contractors show exceedences in water quality standards for iron, and sometimes arsenic, nickel, and zinc, in surface water upstream from the reservation boundary.¹⁵

Some conflicting information regarding water quality violations exists because there is a dispute over which water quality standards apply. The 1996 Consent Decree provided for temporary technology-based water quality standards that Pegasus was required to meet pending the completion of the ground water and surface water collection systems and the construction of the water treatment plants at Zortman and Landusky. Following construction of the systems, DEQ intended to issue Montana Pollution Discharge Elimination System (MPDES) permits to Pegasus that would have included more stringent effluent standards. Pegasus constructed the water collection and treatment systems, but the 1998 bankruptcy eliminated the existence of Pegasus as a MPDES permit applicant. Since then, the DEQ has been maintaining and operating the water collection and treatment systems under the Consent Decree standards. This is one of the complaints being argued in the Tribes' Clean Water Act lawsuit.

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In June 2004, the BLM prepared and signed an Action Memorandum stating that it considers the mines to be abandoned following the completion of the Pegasus bankruptcy and that it intends to use its authority under the federal Superfund Program (CERCLA) as a federal land management agency to maintain the mine water capture and treatment systems. A CERCLA designation negates the need for a National Pollution Discharge Elimination System (NPDES) or MPDES permit to be issued for mine discharges. CERCLA still obligates the agency and the DEQ to attain applicable or relevant and appropriate requirements (ARARS) of federal and state laws, including water quality requirements, to the extent practicable.

Swift Gulch

Chapter 3 of the final 2001 SEIS described the condition of surface and ground water near the mines in detail on a drainage-by-drainage basis. Swift Gulch is a tributary of the South Fork of Bighorn Creek, which crosses the reservation boundary and becomes a tributary of Little Peoples Creek, which flows through the town of Hays. Swift Gulch is in a canyon approximately 700 feet below and 500 feet north of the northern edge of the Landusky mine pit (Figure 2). Stream distance between the Landusky mine and the Fort Belknap Reservation boundary is approximately 6,000 feet. Swift Gulch flows during the spring runoff, but at other times it is intermittent, surfacing and submerging along its length until it is joined by the North Fork of Bighorn Creek, a perennial stream. The SEIS describes concerns about the water quality of Swift Gulch from ground water seeps that enter the stream between the Landusky mine pit and the stream. There was some indication in 2001 that the water was acidic and had elevated levels of sulfates and metals. Red orange iron precipitates coat a portion of



Swift Gulch, 2004. Dean Stiffarm Photo.

the stream bottom. The water quality in the headwaters of Swift Gulch near the mine has been deteriorating since about 1999.¹⁶ The water has become more acidic, decreasing from about pH 7.5 to pH 3.7 according to tribal officials, and it is high in iron. The iron precipitate discoloration appears to be moving downstream towards the reservation boundary and is now visible near the confluence of Swift Gulch and the South Fork of Bighorn Creek.¹⁷

The specific causes or sources of this degradation have not yet been conclusively identified. The seeps in Swift Gulch are not being captured or treated at this time. According to some sources, there is some evidence that the seeps may be hydraulically connected to the mine operations.¹⁸ The quality of water coming out of the seeps has become worse since the Landusky mine pit was developed. Also, the mine pit intercepts a sheer zone or fault fracture area that generally runs southwest to northeast beneath the northern portion of the Landusky pit complex nearest Swift

Gulch. There is also some geologic evidence of historic iron staining in the canyon, so there may be a natural component to some of the contamination.¹⁹ The water quality situation in Swift Gulch is acknowledged by the agencies to be an issue that requires further study and analysis.



Swift Gulch Drainage, 2001. BLM Photo.

Pegasus partially backfilled the north end of the Landusky pit in 1995-1996 with rock that produced low pH acid. In 2002, the DEQ attempted to further isolate the area with additional nonacid-producing rock backfill, which was then covered with an impermeable barrier in an effort to limit the infiltration of precipitation to the area, including infiltration through the sheer zone. It was not anticipated that this effort would produce any immediate positive results if, in fact, this was the source of the contaminated water that was appearing in the seeps along the upper reaches of Swift Gulch. To date, the situation has not improved. There are several monitoring sites along Swift Gulch and the South Fork of Bighorn Creek that are monitored routinely. Although Swift Gulch is clearly impacted, as yet there have been no exceedences of the Consent Decree or draft MPDES water quality limits at the reservation boundary monitoring site designated as L-48.²⁰

I mpacts to the Milk and Missouri River Drainages

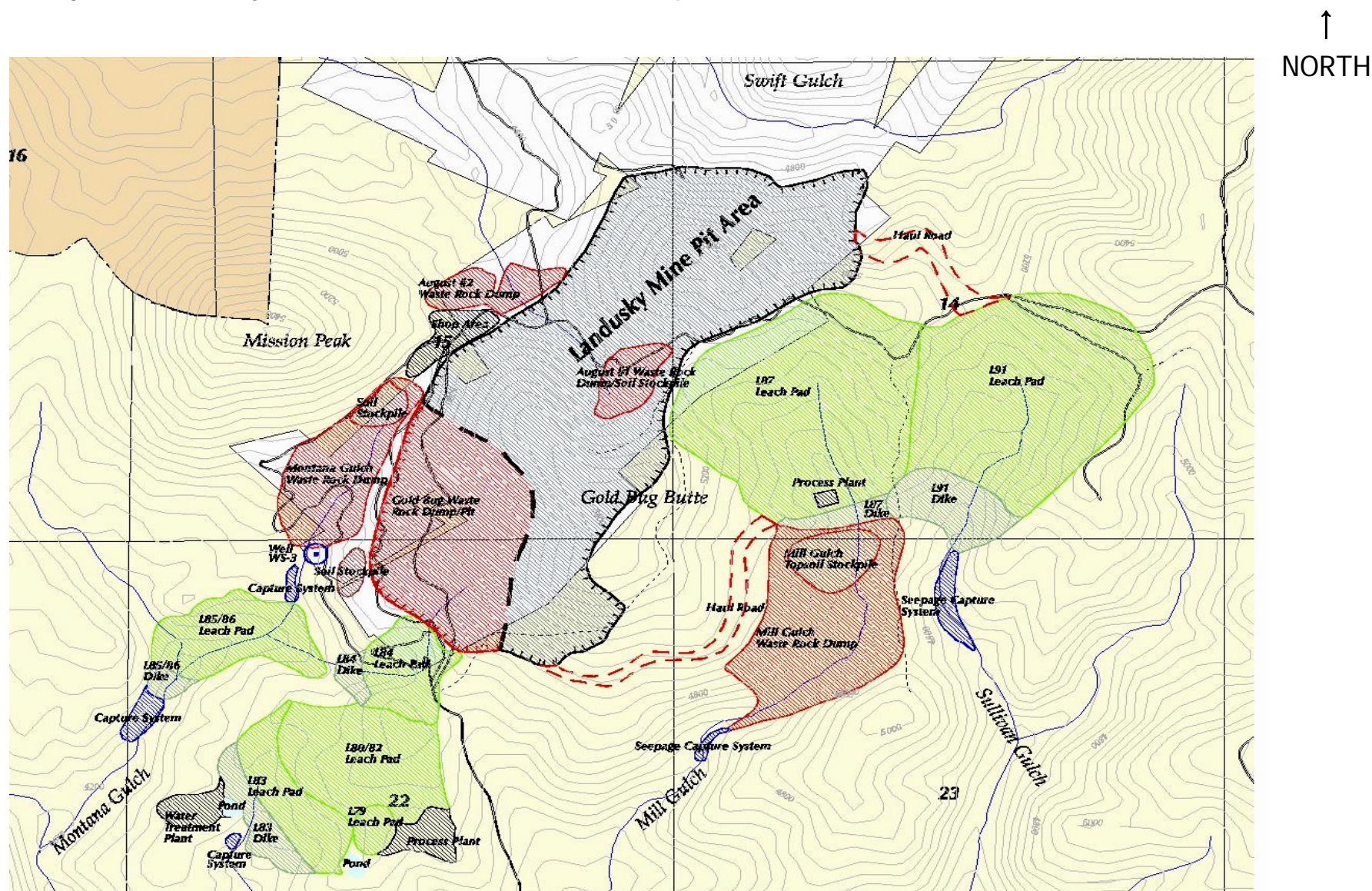
The Landusky mine is the headwaters area for King Creek and Swift Gulch, which drain to the northwest through the Fort Belknap Reservation as tributaries to Little Peoples Creek and on to the Milk River. The Landusky mine is also the headwaters area for Montana Gulch, Mill Gulch, and Sullivan Gulch--tributaries of Rock Creek, which flows south to the Missouri River. All of these streams are intermittent near the mine site. Perennial segments of Rock Creek and Little Peoples Creek several miles downstream of the mine support small brook trout populations.

The Zortman mine is a headwaters area for Lodgepole Creek, which drains north through the Fort Belknap Reservation and on to the Milk River, and for Ruby Gulch and Alder Gulch, which drain south to the Missouri River (**Figure 3**). Lodgepole Creek is intermittent near the mine, but it flows perennially in its lower reaches and supports a brook trout population several miles north of the Zortman mine. Ruby Gulch and Alder Gulch are intermittent streams, but they may have significant flows following storm events or during spring runoff.²¹

The Milk River is an estimated 30-35 air miles from the Zortman and Landusky mines and further by stream miles along Little Peoples Creek and Lodgepole Creek. The Missouri River is an estimated 20-25 air miles from the mines and further by stream miles along Rock Creek and Ruby Gulch. The agencies have not developed any sampling data on the Missouri or Milk Rivers in the vicinity of the mines to indicate whether they have been impacted by the mining activity at Zortman and Landusky. The DEQ, the BLM, and their consultants consider both rivers to be far beyond the area that is potentially influenced by the mines, and according to the BLM, monitoring data does not show contamination that extends beyond the Little Rocky Mountains landform.²²

The agencies have been following a sampling and monitoring plan in the Consent Decree. A more recent long-term water monitoring program was developed in 2002 by technical specialists from the agencies, the EPA, and the Tribes in anticipation of the issuance of MPDES permits, but that plan has not been implemented nor have the permits been issued.²³ Water monitoring is concentrated in the immediate area of the mines in areas most likely to be impacted. There are a few sampling stations approximately 2 miles from the mines, but they are no longer used.

Figure 2: Landusky Mine. Facilities and Land Status Map



Source: BLM Action Memorandum, June 2004

The current ground water monitoring plan involves sampling about 44 wells twice each year. Water quality trends in most wells are reportedly stable, and the ground water chemistry meets drinking water standards with some exceptions. Water samples from a few wells that are located between mine waste facilities and the water collection and treatment systems sometime exceed standards. Others that were drilled into unmined mineralized rock show results that exceed drinking water standards for arsenic with no evidence of any influence from mining activity. Also, deep monitoring wells located between the north edge of the Landusky pit and Swift

The current ground water monitoring plan involves sampling about 44 wells twice each year.

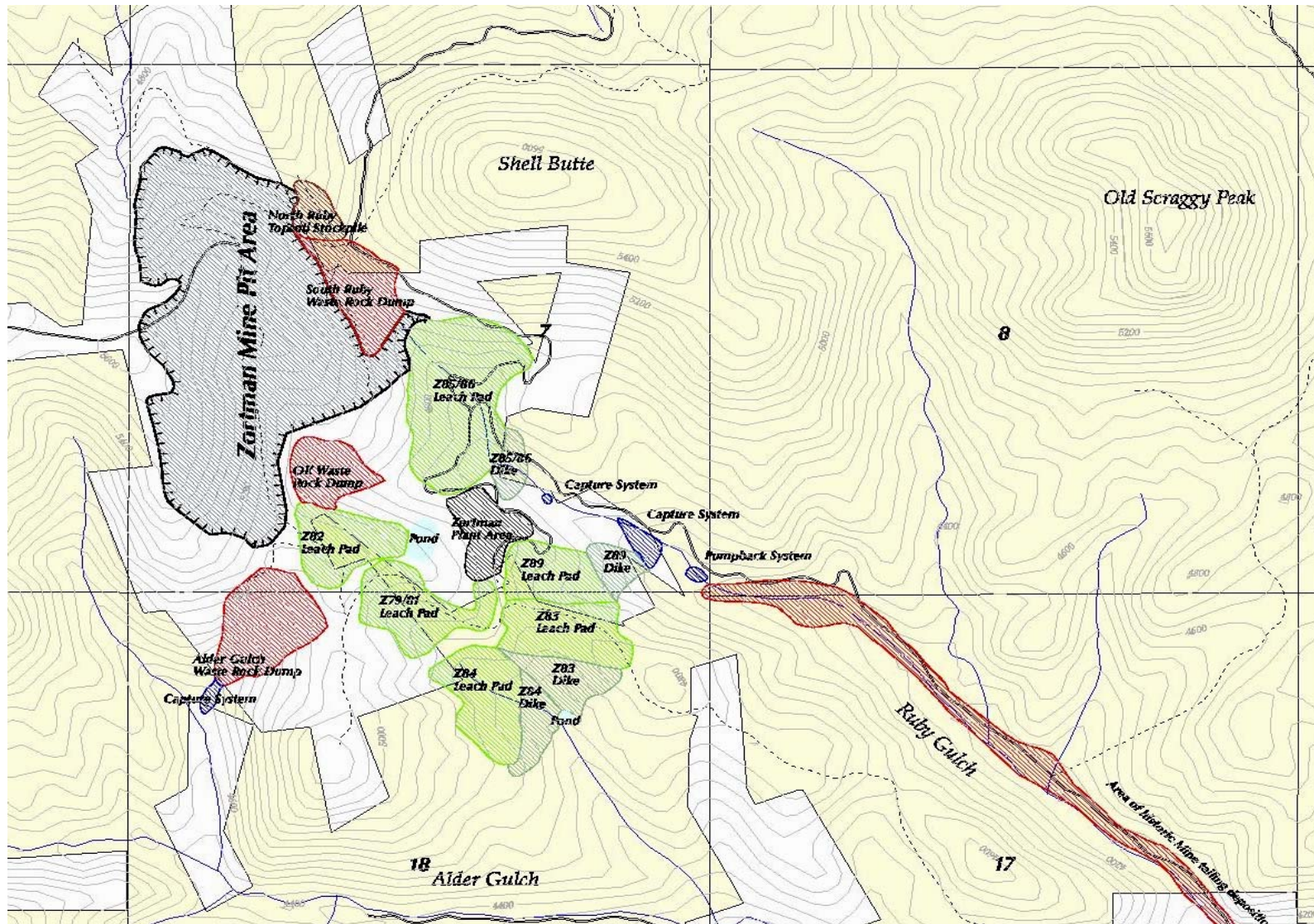
Gulch have shown deteriorating water chemistry for the past few years.²⁴ The surface and ground water monitoring program costs approximately \$60,000 per year, and it is deemed adequate for current needs.

The SEIS concluded that the surface and ground water in Lodgepole Creek is not impacted by mining activities. Very little mining occurred at the Zortman mine in the headwaters of Lodgepole Creek. Water quality monitoring on Lodgepole Creek at the reservation boundary shows no change in water chemistry during mine operations. Alder and Ruby Gulch join near the town of Zortman, and Ruby Gulch typically infiltrates into the ground near there. Mine-impacted water near the mine site upstream from the town is captured at several locations and treated at the Zortman water treatment plant.

On the north side of the Landusky mine, there are no water capture and treatment facilities for King Creek and Swift Gulch. Swift Gulch wasn't identified as a problem when the Consent Decree was signed in 1996. As noted, there are contaminated seeps entering Swift Gulch from an as yet unidentified source and the water quality in Swift Gulch appears to be getting worse with time according to the DEQ. Pegasus was required to construct a water collection and passive treatment facility for King Creek but failed to complete the project prior to bankruptcy. In 2000, the EPA removed 78,000 cubic yards of tailings left from historic mining activities in King Creek. In 2002 and 2003, the DEQ's contractors removed the waste rock dump from the head of the King Creek drainage. The water in the headwaters of King Creek has been impacted by mining. Although the water is not acidic, nitrate and selenium levels exceed some standards.²⁵ The DEQ does not anticipate King Creek to be a serious future problem, but sampling is continuing.

Figure 3: Zortman Mine. Facilities and Land Status Map

↑
NORTH



Source: BLM Action Memorandum, June 2004

The intermittent streams that drain from the south side of the Landusky mine all have surface and ground water capture facilities that route water through the Landusky water treatment plant. Water monitoring below these capture facilities indicates that the water quality in Mill Gulch, Sullivan Gulch, Montana Gulch, and Rock Creek meets the Consent Decree standards as well as the draft MPDES permit standards.²⁶

Much of the water at the mines is high in sulfates. There are no standards for sulfate in the Consent Decree or in the draft MPDES permits. A DEQ compliance report for violations of the Consent Decree standards at the Zortman and Landusky mines between May 2003 and May 2004 lists only five exceedences (Table 1).

Table 1: Exceedences of Consent Decree Standards - May 2003 to May 2004

LOCATION	PARAMETER	STANDARD	SAMPLE/DATE
Zortman water treatment plant	Total suspended solids	daily maximum level = 30 ppm	35.4 ppm / 7-31-03
Ruby Gulch pond underdrain	Copper	30-day average = 0.15ppm	0.442 ppm / 9-30-03
same	pH	range = 6.0 - 9.0	5.12 / 9-30-03
same	Zinc	30-day average = 0.75ppm	1.17 ppm / 9-30-03
Landusky - lower Montana Gulch pond overflow	Total suspended solids	daily maximum level = 30 ppm	34 ppm / 1-31-04

Source: Tom Reid, DEQ Water Protection Bureau, 7-1-04

C urrent Reclamation Efforts and Water Quality Status

With the exception of Swift Gulch, the DEQ believes that the surface and ground water resources in the area are being protected by the current and proposed mine reclamation and water treatment efforts. The purpose of the mine reclamation is spelled out in the SEIS and in the Record of Decision. Essentially, the reclamation of the mines has two primary components, both intended to address the protection of surface and ground water quality. The first is the physical reclamation of the mine pits, roads, waste rock dumps, and leach pads. This effort is designed to improve the long-term stability of mine excavation features, isolate and cover acid-producing materials, provide for proper drainage, reduce infiltration by precipitation and runoff, reestablish vegetation, and improve aesthetics. The second effort is to capture and treat surface and shallow ground water and leach pad drainage until contaminants can be reduced to acceptable levels. The magnitude and duration of the water treatment effort is largely dependent on the success of the land reclamation effort. But in no case short of the physical encapsulation of the mine facilities will the need for long-term water treatment be unnecessary.

The mine operations, particularly the larger and deeper Landusky mine, exposed sulfide rock that produces acid rock drainage when it is exposed to air and water. This acid rock drainage, or ARD, in the presence of the exposed surfaces of mineralized rocks, can mobilize metals in the rock and contaminate surface and ground water. The reclamation plans focus on identifying the sources of acid-generating materials and isolating them from surface and ground water infiltration to control the source of contaminated water and reduce the amount that needs to be treated.

Before the 1998 bankruptcy and in partial fulfillment of the requirements of the Consent Decree, Pegasus was required to capture all surface and shallow ground water at each discharge and construct a water treatment plant at each mine. Buried capture systems collect water from beneath the leach pads and below the waste rock dumps before it flows offsite and routes it to either the water treatment plant at the Zortman mine or the one at Landusky. These plants use lime to treat the acidity and precipitate metals out of the water collected by the capture systems. Since 1999, these plants have captured and treated over a billion gallons of mine drainage.²⁷

The Zortman water treatment plant treats between 45 and 86 million gallons of water per year. The treated water from the Zortman plant meets the Consent Decree limits and would meet most of the draft MPDES limits most of the time (Table 2). Treated water is returned to Ruby Gulch.

Table 2: Zortman Water Treatment Plant - Typical Chemistry*

Parameter	Water In	Water Out	% Removal	Consent Decree limit (daily max)	Possible MPDES limits	Water Quality Standard**
pH	3.5 3.5	7.5 7.5	---	6.0-9.0	6.5-9.0	6.5-8.5
TSS (total suspended solids)	20	25		30		20
arsenic	0.015 0.080	<0.003 <0.003	>80%	NA	0.018	0.018
cyanide (total)	0.015	0.010		<0.005		0.0052
cadmium	0.2 0.2	0.004 0.005	98%	0.10	0.005	0.005
copper	3.50	0.015		0.30		0.031
iron	35 40	0.2 0.5	99.7%	NA	1.0	1.0
lead	0.005 0.005	<0.003 <0.003	50%	0.60	0.015	0.015
manganese	30 35	3 3.5	90%	NA	----	0.05
mercury	ND	ND		0.002		0.00005
selenium	0.015	0.010		NA		0.005
sulfate	3000 3000	2400 2600	20%	NA	---	250
zinc	5.0	0.05		1.50		0.388

* in mg/L or parts per million (ppm): **bold source: Jepson, DEQ - EQC testimony**; other source: BLM Action Memorandum

** These include primary and secondary standards from a variety of sources and are presented only to assist in characterizing the potential for contaminants in a release.

The Landusky water treatment plant treats between 195 and 274 million gallons of water per year. The treated water from the Landusky plant achieves the Consent Decree standards and would likely meet most draft MPDES limits (Table 3). Treated water is discharged to Montana Gulch.

Table 3: Landusky Water Treatment Plant -Typical Chemistry*

Parameter	Water In	Water Out	% Removal	Consent Decree limit (daily max)	Possible MPDES limits	Water Quality Standard**
pH	6.0 6.0	7.5 7.5	---	6.0-9.0	6.5-9.0	6.5-8.5
TSS (total suspended solids)	20	7		30		20
arsenic	0.150 0.15	0.025 <0.025	83%	NA	0.018	0.018
cyanide (total)	0.05	ND		<0.005		0.0052
cadmium	0.010 0.015	0.001 0.004	90%	0.10	0.005	0.005
copper	0.03	0.005		0.30		0.031
iron	10 10	0.3 0.3	97%	NA	1.0	1.0
lead	0.004 0.004	<0.003 <0.003	>50%	0.60	0.015	0.015
manganese	3.0 4.0	1.5 3.0	50%	NA	---	0.05
mercury	ND	ND		0.002		0.00005
selenium	0.005	0.005		NA		0.005
sulfate	600 650	500 900	17%	NA	--	250
zinc	0.80	0.05		1.50		0.388

* in mg/L or parts per million (ppm): **bold source: Jepson, DEQ - EQC testimony**; other source: BLM Action Memorandum

** These include primary and secondary standards from a variety of sources and are presented only to assist in characterizing the potential for contaminants in a release.

However, the lime precipitation water treatment plants are not effective in treating the cyanide, nitrate, and selenium from the leach pad process solution. An estimated 129 million gallons of residual cyanide process solution is stored above the leach pads within the leach pad circuits, with additional accumulations expected in the future from water infiltration. In 2001, the agencies built a bioreactor water treatment system on the Landusky mine site with remaining construction bonds from Pegasus' surety to treat the heap leach solutions that drain from the leach pads at the mine. Because the ore placed on the heap leach pads was treated with alkaline materials to enhance the gold recovery process, the heap leach solutions are not yet acidic, but they are generally too high in selenium, nitrates, and cyanide to meet stream

discharge limits (Table 4). The treated Landusky heap leach water from the bioreactor is discharged to a land application area on Goslin Flats below the town of Zortman, where it is sprinkler-irrigated. Prior to reclamation, approximately 80 million gallons of precipitation was collected in the Landusky leach pads and required treatment each year. DEQ is hopeful that land reclamation efforts will reduce this to 15-30 million gallons per year.



Landusky Bioreactor, 2004. BLM Photo.

The leach pad water from the Zortman mine is also collected and piped to the land application area on Goslin Flats. Prior to reclamation of the leach pads at Zortman, the pads drained approximately 30 million gallons of water per year. DEQ believes that the reclamation and revegetation of the leach pads may eventually reduce this flow to about 5-10 million gallons per year. This may make other disposal options available instead of using the land application area.²⁸

Table 4: Bioreactor Chemistry for Leach Pad Process Water*

Parameter	Typical Heap Leach influent	Typical effluent to Land Applic or water treatment plant	Water Quality Standard**
pH	6.8	7.2	6.5 - 8.5
arsenic	0.010	0.002	0.018
cyanide(total)	0.37	0.29	0.0052
cadmium	0.75	0.03	0.005
copper	0.100	0.01	0.031
lead	0.002	ND	0.015
nitrate	82	1.0	10.0
selenium	0.47	0.06	0.005
zinc	2.00	0.75	0.388

* in mg/L or parts per million (ppm): Source; BLM Action Memorandum

**These include primary and secondary standards from a variety of sources and are presented only to assist in characterizing the potential for contaminants in a release.

The DEQ and its federal partner, the BLM, have been reclaiming the mines using bonds from the settlement agreement with Pegasus' sureties. The preferred alternative in the SEIS for the reclamation of the Zortman mine was option Z6, and the preferred alternative for the reclamation of the Landusky mine was option L4. As stated previously, these options were estimated to cost \$22.5 million more than what the agencies had available from the sureties; \$5 million more for Zortman and \$17.5 million more for Landusky. Alternatives Z3 and L3 were reclamation choices that the agencies believed would also comply with the applicable laws and that could be accomplished with the available bond funds. These alternatives are perceived by the Tribes and others to be less protective of the environment than the preferred alternatives. The SEIS provides detailed descriptions and comparisons between each alternative. There is litigation pending in the courts to require the agencies to implement alternatives Z6 and L4.

The agencies, through competitive bidding and significant cooperation from Spectrum Engineering and its subcontractors and with the infusion of over \$5 million in federal funds from the BLM, have been able to reduce costs and implement most of the reclamation projects in alternatives Z6 and L4. By June 2004, the BLM estimated that the \$22.5 million reclamation shortfall had been reduced to about \$1.53 million.²⁹ Reclamation at Zortman is complete under the Z6 alternative with the exception of

relocating the top portion of the Alder waste rock dump to the North Alabama pit and covering and revegetating both areas. Reclamation at Landusky is complete under the L4 alternative with the exception of partially backfilling portions of the pit with the 85-86 leach pad, which is currently being removed from the headwaters of Montana Gulch, and the completion of some ongoing contracts. As of August 2004, the DEQ and its contractors determined that there were sufficient funds available to complete the L4 reclamation alternative for Landusky by the end of 2005, but that the agencies were still \$1.423 million short in the amount of funds necessary to complete the Z6 alternative at the Zortman mine.³⁰

Future Needs - Reclamation and Water Quality

Reclamation

Through March 2004, the DEQ had spent approximately \$37,281,163 to reclaim the Zortman and Landusky mines including \$33,666,658 in bond settlement funds, \$2,017,905 in federal dollars, and \$1,596,600 in state funds.³¹ The agency's efforts at source control through mine reclamation appear to be nearing completion with the reclamation of the mines in accordance with the preferred alternatives Z6 and L4 despite the initial shortage of bond money.

Recently, the BLM was able to obtain an additional \$1.2 million through its abandoned mine program to complete the L4 alternative and remove and reclaim the Landusky 85-86 heap leach pad and use the material to help backfill and further isolate materials in the

The agencies determined they are short \$1.423 million in the amount of funds necessary to complete the Z6 alternative at the Zortman Mine.

Landusky pit.³² This leaves the reclamation project short by the \$1.423 million for completion of the Z6 alternative at Zortman. The DEQ has submitted an application to the Department of Natural Resources and Conservation (DNRC) for a \$300,000 Reclamation and Development Grant (RDG) to help cover some of those costs. Grant applications are ranked by the DNRC, and the priority projects will be recommended to the 2005 Legislature for approval and funding in House Bill 7. The revenue is generated from interest on the Resource Indemnity Trust Fund.



Landusky Water Treatment Plant, 2004. BLM Photo.

One major reclamation problem exists. The BLM, DEQ, and the Tribes are concerned about the seeps on the north side of the Landusky mine pit that are degrading Swift Gulch. The contamination is obvious, but the cause is not certain. Addressing this problem may be difficult and costly, given the dispersed nature of the seeps, the difficulty in identifying their source, and the uncertainties in trying to control ground water movement. Reclamation efforts intended to control what was assumed to be the source of the water have not produced the desired results so far. The BLM is currently conducting a \$60,000 study of the problem in Swift Gulch.³³ The DEQ has also applied to the DNRC for a \$300,000 RDG to investigate the hydrology of the area in an attempt to identify the source of the problem and craft a possible solution. Depending on the solution, additional reclamation funds or water treatment funds may be necessary in the future.

The DEQ also has some remaining funds from the Pegasus bonds that are earmarked for the construction of a water treatment system in the headwaters of King Creek if

the source controls and waste rock removals that were implemented prove to be inadequate and if further water treatment is determined to be necessary.

Water Treatment

The BLM's June 2004 Action Memorandum describes threats to the public health and welfare and the environment that could result if operation of the water capture and treatment systems is not continued at the mines. If the systems fail or cease operation, the BLM maintains that "the release of hazardous substances would increase greatly without the benefit of treatment, creating significant environmental damage. This includes the release of solutions containing metals such as arsenic, cadmium, copper, selenium, and zinc; plus cyanide complexes, nitrates, and solutions having low pH (acidic) levels".³⁴ The document warns that drinking water supplies or sensitive ecosystems could be contaminated and that human and animal populations could be exposed to the toxic effects of these substances.

The major problem and most critical financial need at the Zortman and Landusky mines is the fact that there are insufficient funds to maintain the water treatment systems. Pegasus provided two sources of funding for the operation and maintenance of the water treatment plants. Both are considered to be insufficient.

The first is the \$14,626,422 short-term (20-year) water treatment bond that was intended to pay for the maintenance and operation of the Zortman and Landusky water treatment plants from June 30, 1997, until June 30, 2017. One-twentieth of this bond or \$731,321 is provided to DEQ by the surety each year. Since Pegasus operated the plants during 1997, the actual bond funds provided to DEQ will total \$13,895,101. Actual costs to operate and maintain the water treatment plants are shown below.³⁵

<u>Year</u>	<u>Cost</u>	<u>Bond</u>	<u>Shortage</u>
1999	~\$1,200,000	\$731,321	(~\$468,700)
2000	\$843,387	\$731,321	(\$112,066)
2001	\$879,727	\$731,321	(\$148,406)
2002	\$905,899	\$731,321	(\$174,578)
2003	\$758,267	\$731,321	(\$ 26,936)
2004 (½ year)	\$424,143	\$365,660	(\$ 58,483)

The BLM has provided \$500,000 to cover the shortfall for the past few years, but those funds are nearly expended. An August 2004 memorandum of agreement (MOU)

between the DEQ and the BLM that was prepared in conjunction with the BLM's June Action Memorandum lists the obligations of both parties to maintain the water capture and treatment facilities at the mines. One provision of the agreement states that the "BLM will provide supplemental funding to DEQ, to the extent allowed in BLM's budgeting process, in order to maintain operation of the water treatment plants after the annual surety payment has been expended". Either party may terminate the MOU following a 60-day notice. The additional BLM funds are subject to congressional funding of BLM's budget. Still, this is an encouraging indication of BLM's willingness to provide continuing financial assistance for short-term water treatment.

In the absence of any additional funding, the DEQ's contractor currently estimates that there will be a \$12.1 million shortage in what will be needed over the next 13 years to cover the costs of operating and maintaining the water treatment plants. This translates to a net present value of approximately \$7.45 million if the funds were made available by January 2005 and invested at interest.³⁶ Meanwhile, the DEQ has applied to the DNRC for a third \$300,000 RDG to help cover the shortages of operating the water plants for approximately 3 years.

The DEQ's contractor projects that it will cost \$1.8 million to operate and maintain the water treatment plants in the year 2017 given current operating costs. The costs of operating the plants could increase or decrease over time, depending on the amount of water that requires treatment based on precipitation and the success of reclamation efforts and the inflationary costs of operation, repair, and maintenance. Added to the cost of water treatment is the maintenance and operation of the bioreactor water treatment process, which was not anticipated in the Consent Decree and not bonded for by Pegasus.

Perhaps more important in terms of budget shortfalls is the bond that is available for long-term water treatment after June 30, 2017. Pegasus was required to establish a trust fund that would pay for long-term water treatment defined in the SEIS until the year 2080. The difficulty of predicting needs, technology, and financing that far into the future or beyond are described in detail in the SEIS. A bond package of zero coupon bonds was purchased by Pegasus and by the DEQ following the Pegasus bankruptcy to provide a long-term trust reserve estimated to be worth approximately \$14.8 million by the year 2017. The DEQ and its consultants have calculated that given the current costs of operating the water treatment plants, the \$14.8 million is about \$11.1 million dollars short of what may be needed to pay for long-term water treatment if the funds were made available by January 2005 and invested at 6%

interest. The SEIS also predicted that the trust reserve was \$11 million less than what was needed to be invested in 2001 in order to fund long-term water treatment after 2017.

A simple annuity calculation shows that a trust reserve valued in 2017 at \$14.8 million earning a 5% return would provide approximately \$800,000 for 43 years or until the year 2060. Of course the annual costs are not likely to remain at \$800,000 and there are no extra funds to pay for replacing the water treatment plants using whatever technology may be available or necessary at the time.

The 2003 Legislature in HB 2 authorized the sale of hard-rock mining reclamation bonds, backed by metaliferrous mine tax revenue, up to the amount of \$2.5 million provided that Congress appropriates at least \$10 million during the current biennium for the purpose of providing a total of \$12.5 million to fund the long-term water treatment trust reserve for Zortman and Landusky. The federal Department of Interior and Related Agencies appropriations bill (S. 1391) for 2004 included a request for funds, but it was not accepted. In rejecting the request, the Committee on Appropriations stated that "the Committee understands a proposal is being prepared for FY 2005 to address the plan set forth in the Record of Decision for Reclamation. The Committee continues to believe protecting water quality in the region should be a top priority for the BLM budget request". There have been no federal appropriations to date.

S ummary

A few specific water quality problems that originated with historic mining at Zortman and Landusky are better now than they were before the Pegasus mines began operating according to the DEQ.³⁷ The historic discharges from several old mine adits have been captured and are now being processed through water treatment plants that were built at the insistence of the agencies. Since the Pegasus bankruptcy, reclamation efforts funded by the DEQ, BLM, and EPA have removed the historic tailings in Ruby Gulch and the tailings dams and sediments in King Creek. Waste rock dump water discharges are now being captured and routed through one of the water treatment plants. The poor quality waters still draining from the leach pads are being captured and treated with some success. However, the scale of the disturbance from the Pegasus operations and the acid-producing rock at the mines have created reclamation and water treatment challenges that will continue for many years.

Much effort, research, and funding has been applied to these mines in an effort to produce and implement an environmentally sound reclamation plan in the absence of a mine operator. That task may not be complete given the continuing challenges involving discharge permits, water quality violations,

diversions of water, and other issues that have been raised in pending litigation.

There is no disagreement that conditions in Swift Gulch on the north side of the Landusky mine pit merit additional research and attention. With land reclamation efforts nearing completion, emphasis may need to be focused on implementing the surface and ground water monitoring plan in an effort to determine how successful the reclamation efforts have been. There will be a time lag between the completion of reclamation, the establishment of vegetation, and any noticeable changes in water quantity and quality at the mine site. There may be a need for additional reengineering and design. There may be a need for additional source isolation and reclamation. With the Pegasus bankruptcy proceedings now complete and with the imminent expenditure of the last of the reclamation bonds, any additional land reclamation funds must come from other sources. Meanwhile, water capture and treatment will be required at these mines for the indefinite future. Unless costs can be reduced, there are immediate and future needs for adequately funding these water treatment efforts.

There is no disagreement that conditions in Swift Gulch on the north side of the Landusky mine pit merit additional research and attention.

Endnotes

1. Record of Decision for Reclamation of the Zortman and Landusky Mines, Bureau of Land Management and Montana Department of Environmental Quality, May 2002 (ROD, 2002).
2. United States of America and State of Montana v. Pegasus Gold Corporation and Zortman Mining, Inc., Civil Action No. 95-95-BLG-JDS, and Gros Ventre Tribe, Assiniboiné Tribe, Fort Belknap Community Council, and Island Mountain Protectors Association v. Pegasus Gold, Inc., Pegasus Gold Corporation, and Zortman Mining, Inc., Civil Action No. 95-96-BLG-JDS, Consolidated Consent Decree, (Consent Decree).
3. Assiniboiné and Gros Ventre Tribes and Fort Belknap Community Council v. Bureau of Land Management, Before the United States Dept. of Interior Office of Hearings and Appeals Board of Land Appeals, BLM Nos. MTM 77778-77779, MT-0670-05-1990-01, June 27, 2002.
4. Assiniboiné and Gros Ventre Tribes and Fort Belknap Indian Community Council, Montana Environmental Information Center, Mineral Policy Center, National Wildlife Federation v. Montana Department of Environmental Quality, Kelvin Buchanan in His Capacity as Bankruptcy Trustee for Zortman Mining, Inc., and Pegasus Gold Corporation, Montana First Judicial District Court, Cause No. ADV-2002-473, July 2002.
5. Impacts to Surface and Ground Water From Ten Montana Metal Mines, pp. 32-40, Stuart Levit, Public Education for Water Quality Project, August 1996.
6. Gros Ventre Tribe, Assiniboiné Tribe, and the Fort Belknap Indian Community Council v. United States of America; Bureau of Land Management, et al., Order, p. 12, CV 00-69-M-DWM, June 28, 2004.
7. Scott Haight, BLM, Lewistown Area Office, report comments, August 16, 2004.
8. Assiniboiné and Gros Ventre Tribes v. Luke Ployhar, Owner of Zortman and Landusky Mines; Jan P. Sensibaugh, Director of MDEQ; and Kathleen Clarke, Director of US BLM, Civil No. CV 04-17-M-DWM, January 28, 2004.
9. See endnote 4, Department of Environmental Quality's answer to complaint, p. 4.
10. Agency for Toxic Substances and Disease Registry (ATSDR), May 14, 1999. Petitioned Public Health Assessment for Kings Creek (a.k.a. Fort Belknap Indian Reservation/Zortman Mining Incorporated).
11. Final Supplemental Environmental Impact Statement for the Zortman and Landusky Mines; BLM and DEQ; December 2001, pp. 3-102, 6-71 (SEIS, 2001).
12. SEIS, 2001 p. 6-72.

13. Phone log, Jay Sinnott, EPA Water Program, Helena office, June 30, 2004.
14. Phone log, Jan Sensibaugh, DEQ Director, July 6, 2004.
15. Quarterly water quality monitoring reports for the Zortman and Landusky mine sites, Spectrum Engineering, 2004.
16. Wayne Jepson, DEQ, e-mail correspondence, June 23, 2004
17. Dean Stiffarm, Fort Belknap Environmental Office, phone log, July 9, 2004.
18. Andy Huff, Indian Law Resource Center, report comments, p. 4, August 19, 2004, and David Chambers, Second Supplemental Declaration of David Chambers, Cause No. CV 00-69-M-DWM, p. 3.
19. Supplemental Declaration of Scott Haight, BLM, Cause No. CV 00-69-M-DWM, p. 5.
20. Deposition of Wayne Jepson, DEQ, Cause No. CV 00-69-M-DWM, p. 59.
21. Action Memorandum for Zortman and Landusky Mines; Time Critical Removal, BLM, June 2004, pp. 5-6.
22. Scott Haight, report comments, e-mail, September 14, 2002.
23. Zortman and Landusky Mines Ground Water and Surface Water Monitoring Plan, April 2002, Interagency Technical Working Group.
24. Wayne Jepson, DEQ, e-mail correspondence, July 2, 2004.
25. Wayne Jepson, testimony before the EQC, October 9, 2003.
26. Deposition of Wayne Jepson, pp. 76-80.
27. Action Memorandum, pp. 4-5.
28. Wayne Jepson, DEQ, testimony before the EQC.
29. Action Memorandum, p. 4.
30. Wayne Jepson, DEQ, e-mail correspondence, August 17, 2004.
31. Fiscal spreadsheet, DEQ, June 9, 2004.
32. Bill Maehl, Spectrum Engineering, report comments, July 16, 2004.

33. Phone log, Bill Maehl, Spectrum Engineering, June 3, 2004.
34. Action Memorandum, pp. 6-7.
35. Action Memorandum, p. 4.
36. Spectrum Engineering, cash shortfall projection, August 17, 2004.
37. Personal communication with Wayne Jepson, DEQ project manager, June 2004.

Appendix 1

2003 Montana Legislature

HOUSE JOINT RESOLUTION NO. 43

INTRODUCED BY WINDY BOY, BALLANTYNE, BECKER, BERGREN, BIXBY, BRANAE, BUZZAS, CALLAHAN, CARNEY, P. CLARK, COONEY, CYR, DICKENSON, DOWELL, ELLINGSON, ELLIOTT, FACEY, FRANKLIN, GALLUS, GALVIN-HALCRO, GIBSON, GOLIE, GUTSCHE, HAINES, HANSEN, HARRIS, HEDGES, JACOBSON, JAYNE, JUNEAU, KITZENBERG, LAMBERT, LANGE, LENHART, LINDEEN, MATTHEWS, MUSGROVE, NEWMAN, PARKER, RASER, SMALL-EASTMAN, TESTER, TOOLE, WANZENRIED, WEISS

A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA REQUESTING AN INTERIM STUDY OF THE SURFACE WATER AND GROUND WATER IMPACTS OF THE ABANDONED ZORTMAN AND LANDUSKY MINE SITES ON THE MILK AND MISSOURI RIVER WATERSHEDS AND THE EFFECTIVENESS OF THE STATE RECLAMATION EFFORTS AT THE ZORTMAN AND LANDUSKY MINE SITES IN PROTECTING THE WATERSHEDS; AND REQUESTING THAT THE RESULTS OF THE STUDY BE REPORTED TO THE 59TH LEGISLATURE.

WHEREAS, Pegasus Gold Corporation (Pegasus), through its subsidiary, Zortman Mining Incorporated (ZMI) and its predecessors, owned and operated the Zortman mine and the Landusky mine located in the Little Rocky Mountains of Phillips County, Montana, from 1979 until ZMI entered Chapter 7 bankruptcy in 1998 and abandoned the site; and

WHEREAS, the State of Montana's Department of Environmental Quality (DEQ) is presently directing the land reclamation and water treatment activities and operating the water treatment plants at the mine sites; and

WHEREAS, in 2002, the Bureau of Land Management and the DEQ prepared a joint supplemental environmental impact statement to evaluate alternatives for the final reclamation of the Zortman and Landusky mine sites; and

WHEREAS, the effectiveness and sufficiency of the current and proposed reclamation are not universally acceptable, and the reclamation is admittedly underfunded; and

WHEREAS, water discharges from the mine sites require treatment efforts, possibly into perpetuity; and

WHEREAS, the Little Rocky Mountains are upland water recharge areas for several watersheds and tributaries that supply the Milk River and the Missouri River; and

WHEREAS, current reclamation plans for water treatment at the mine sites contemplate the complete cessation of water treatment as soon as the year 2028.

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA:

That the Legislative Council be requested to designate an appropriate interim committee, pursuant to section 5-5-217, MCA, or direct sufficient staff resources to review the reclamation efforts at the Zortman and Landusky mine sites to:

(1) identify the impacts on surface water and ground water, including the recent degradation of Swift Gulch, attributable to past or present activities at the mine sites;

(2) determine if there are identifiable downstream impacts on the Milk and Missouri River drainages attributable to past or present activities at the mine sites;

(3) determine whether the surface water and ground water resources in the watersheds affected by the mine operations are being protected by the current or proposed state reclamation; and

(4) determine the potential impacts to surface water and ground water resources if additional funding for water treatment and reclamation does not become available.

BE IT FURTHER RESOLVED, that the study be conducted by reviewing available research reports and by soliciting testimony and information from knowledgeable individuals, academic institutions, and the appropriate local, state, tribal, and federal agencies.

BE IT FURTHER RESOLVED, that, in particular, representatives of the Fort Belknap Reservation Environmental Department be included in the study and participate in developing findings and recommendations.

BE IT FURTHER RESOLVED, that, if the study is assigned to staff, any findings or conclusions be presented to and reviewed by an appropriate committee designated by the Legislative Council.

BE IT FURTHER RESOLVED, that all aspects of the study, including presentation and review requirements, be concluded prior to September 15, 2004.

BE IT FURTHER RESOLVED, that the final results of the study, including any findings, conclusions, comments, or recommendations of the appropriate committee, be reported to the 59th Legislature.

- END -